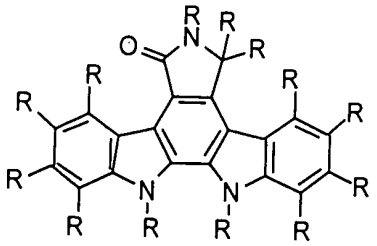
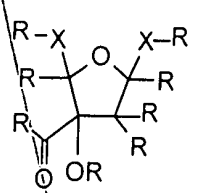
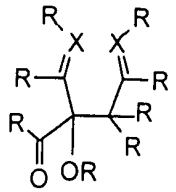
Claims

1. A process for the preparation of furanosylated indolocarbazoles by reacting an indolocarbazole of the formula



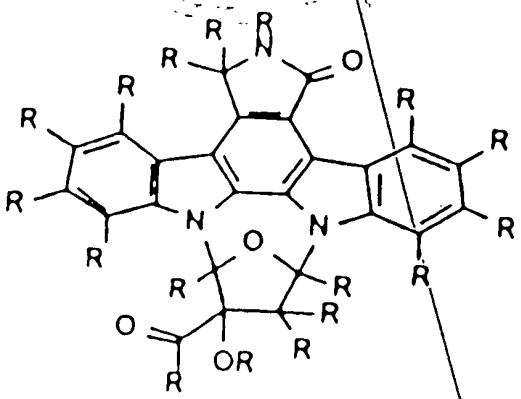
with an acetal selected from the group consisting of the formulae



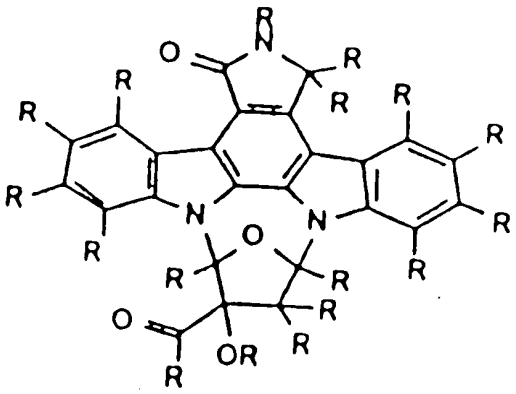


and mixtures thereof,

to produce a glycosylated product of the formula



or



wherein R is selected from the group consisting of

a) a C_{3-10} branched or unbranched alkyl, optionally partially or fully halogenated, hydroxy, C_{1-3} alkyloxy, carboxy, amino, alkylamino;

b) an aryl optionally substituted with one to five groups consisting of halo, hydroxy, C_{1-3} alkyloxy;

c) a hydrogen;

d) a halogen; and

e) mixtures of any of these.

2. A process according to claim 1 wherein the preparation is carried out under conditions that promote acetal exchange or formation.

3. A process according to claim 2 wherein said preparation is carried out in the presence of a Bronsted acid or a Lewis acid.

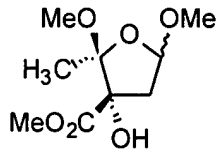
4. A process according to claim 3 wherein the acid is selected from the group consisting of camphor sulfonic acid, *para*-toluene sulfonic acid, and $BF_3 \bullet Et_2O$.

5. A process according to claim 4 wherein camphor sulfonic acid is used as a catalyst and dichloroethane is used as a solvent.

6. A process according to claim 1 wherein R is selected from the group consisting of H, a halogen, Me, Bu, t-Bu, OH, MeO, CO_2Me, DMB, PMB, NHMe, Bn, NH_2, OH, and mixtures thereof.

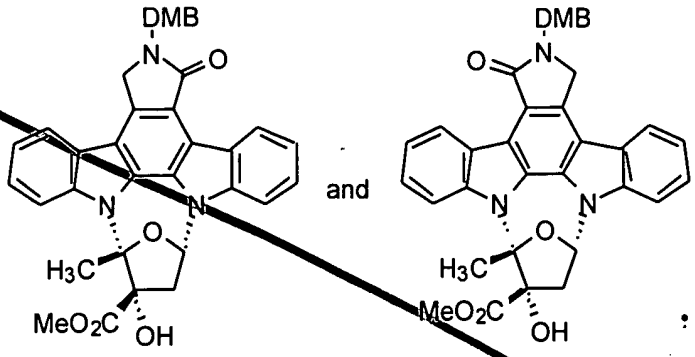
7. A process according to claim 6 wherein R is H, Me, CO_2Me, or OH.

8. A process according to claim 1 wherein a furanose of the formula



is reacted with DMB-protected K252c to give two products of the formulae

E1 cont



9. A product prepared according to the process of claim 1.

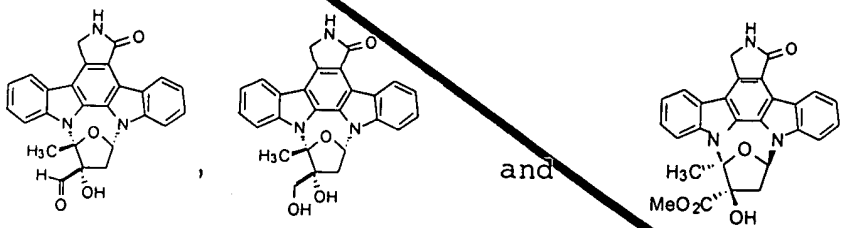
Pend C3

10. A product prepared according to the process of claim 6.

11. A process according to claim 1 wherein the furanosylated indolocarbazole prepared is K252a.

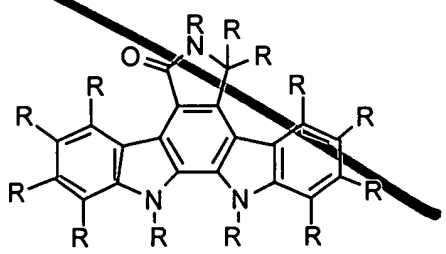
E1 cont

12. A process according to claim 1 wherein the furanosylated indolocarbazoles prepared are selected from the group consisting of:



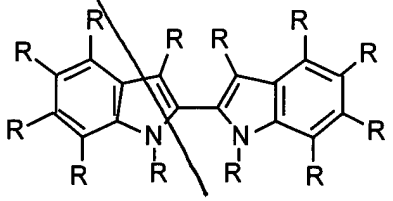
Pend C4

13. A process according to claim 1 wherein the indolocarbazole of the formula



is prepared by reacting a diazo compound of the formula

with a biindole of the formula

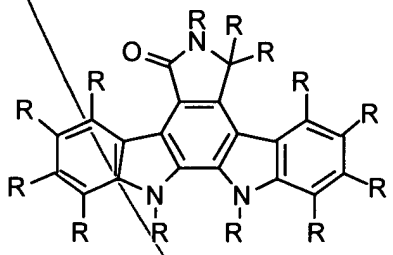


14. A process according to claim 13 wherein the reaction is carried out in the presence of a transition metal catalyst in a solvent capable of solvating the reactants.

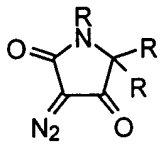
15. A process according to claim 13 wherein the coupling reaction is carried out in the presence of a $Rh_2(OAc)_4$ catalyst.

16. A process according to claim 13 wherein the diazo compound is a diazolaactam and the biindole is a 2,2'-biindole.

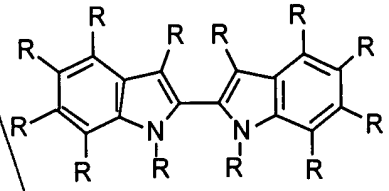
17. A process for the preparation of furanosylated indolocarbazoles by first preparing an indolocarbazole of the formula



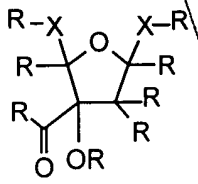
by reacting a diazo compound of the formula

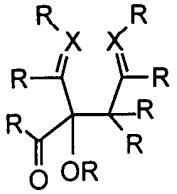


with a biindole of the formula

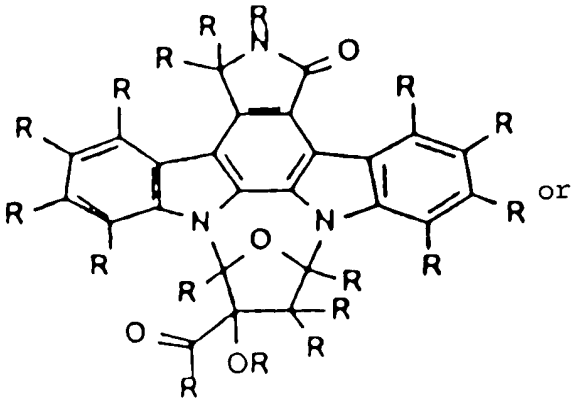


in the presence of a transition metal catalyst in a solvent capable of solvating the reactants, and then reacting the indolocarbazole with an acetal selected from the group consisting of the formulae

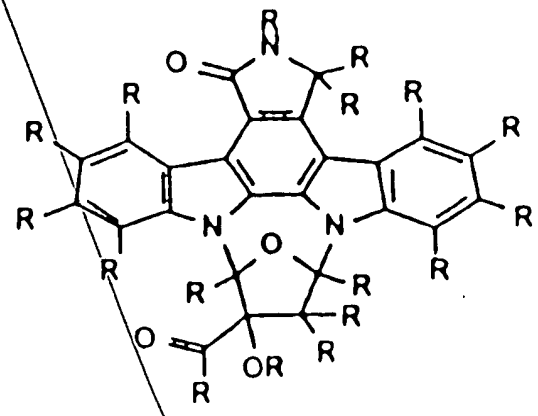




and mixtures thereof, in the presence of a Bronsted acid or a Lewis acid to produce a glycosylated product of the formula



or



wherein R is selected from the group consisting of a C_{3-10} branched or unbranched alkyl, optionally partially or fully halogenated; an hydroxy; a C_{1-3} alkyloxy; a carboxy; an amino; an alkylamino; a hydrogen; a halogen; and mixtures of any of these.

18. A process according to claim 17 wherein R is selected from the group consisting of H, a halogen, Me, Bu, t-Bu, OH, MeO, CO_2Me, DMB, PMB, NHMe, Bn, NH_2, OH, and mixtures thereof.

19. A process according to claim 17 wherein the furanosylated indolocarbazole prepared is K252a.

20. A product produced by the process of claim 17.